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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,023	12/11/2003	Anne Vanet	1421-03	2355
35811 7590 11/19/2008 IP GROUP OF DLA PIPER US LLP ONE LIBERTY PLACE 1650 MARKET ST, SUITE 4900 PHILADELPHIA, PA 19103			EXAMINER SKOWRONEK, KARL HEINZ R	
			ART UNIT 1631	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/734,023

**Applicant(s)**

VAN ET AL.

**Examiner**

KARLHEINZ R. SKOWRONEK

**Art Unit**

1631

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 August 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 11-19, 21-27, 30 and 31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 20, and 28-29 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6 August 2008 has been entered.

### ***Claim Status***

Claims 1-31 are pending.

Claims 11-19, 21-27 and 30-31 are withdrawn as being directed to a non-elected invention and species as indicated in the response filed 4 June 2007 and restriction requirement of 4 May 2007.

Claims 1-10, 20, and 28-29 have been examined.

Claims 1-10, 20, and 28-29 are rejected.

Claims 4 and 6 are objected to.

### ***Affidavit or Declaration under 37 CFR 1.132***

The declaration under 37 CFR 1.132 filed 06 August 2008 is sufficient to overcome the rejection of claims 1-10, 20, 28, and 29 based upon insufficiency of disclosure under 35 U.S.C. 112, first paragraph.

***Claim Objections***

Claims 4 and 6 are objected to because of the following informalities: Claim 4 recites to a "wild sequence" in line 1-2, but should recite "wild type sequence"; and the last line of claim 6 contains a wherein clause which would be more precise if the term "matrices" were followed by a comma. Appropriate correction is required.

***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-10, 20, and 28-29 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-10, 20, and 28-29 are drawn to a process. A statutory process must include a step of a physical transformation, or produce a useful, concrete, and tangible result (State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d 1596 (1998), AT&T Corp. v. Excel Communications Inc. (CAFC 50 USPQ2d 1447 (1999)). The instant claims do not result in a physical transformation, thus the Examiner must determine if the instant claims include a useful, concrete, and tangible result.

As noted in State Street Bank & Trust Co. v. Signature Financial Group Inc. CAFC 47 USPQ2d 1596 (1998) below, the statutory category of the claimed subject matter is not relevant to a determination of whether the claimed subject matter produces a useful, concrete, and tangible result:

The question of whether a claim encompasses statutory subject matter should not focus on which of the four categories of subject matter a claim is directed to — process, machine, manufacture, or composition of matter—but rather on the essential characteristics of the subject matter, in particular, its practical utility. Section 101 specifies that statutory subject matter must also satisfy the other "conditions and requirements" of Title 35, including novelty, nonobviousness, and adequacy of disclosure and notice. See *In re Warmerdam*, 33 F.3d 1354, 1359, 31 USPQ2d 1754, 1757-58 (Fed. Cir. 1994). For purpose of our analysis, as noted above, claim 1 is directed to a machine programmed with the Hub and Spoke software and admittedly produces a "useful, concrete, and tangible result." *Alappat*, 33 F.3d at 1544, 31 USPQ2d at 1557. This renders it statutory subject matter, even if the useful result is expressed in numbers, such as price, profit, percentage, cost, or loss.

In determining if the claimed subject matter produces a useful, concrete, and tangible result, the Examiner must determine each standard individually. For a claim to be "useful," the claim must produce a result that is specific, and substantial. For a claim to be "concrete," the process must have a result that is reproducible. For a claim to be "tangible," the process must produce a real world result. Furthermore, the claim must be limited only to statutory embodiments.

Claims 1-10, 20, and 28-29 do not require production of a tangible result in a form that is useful to the user of the process or apparatus. The claims are directed the abstract process of identifying motifs. The claim recites a step of outputting identified to motifs to a memory, another computer or network. The output to the embodiments of a memory, another computer or network is not tangible. A tangible result requires that the claim must set forth a practical application to produce a real-world result. This rejection could be overcome by amendment of the claims to recite that a result of the process is outputted to a display, or to a user, or in a graphical format, or in a user readable

format, or by including a result that is a physical transformation. **The applicants are cautioned against introduction of new matter in an amendment.**

Claims 1-10, 20, and 28-29 are directed to a process for identifying a motif. The following analysis is taken from the guidance provided in the MPEP at 2104.IV, "Determine Whether the Claimed Invention Complies with 35 USC101". The claims are directed to processes. Here the claims are directed to the abstract idea of identifying motifs that mutate simultaneously or do not mutate simultaneously. The processes do not recite a physical transformation of matter from one state to another. Although the step does recite "physically transforming the identified motifs", the step does not explicitly recite the transformation of matter from one state to another. Giving the claims the broadest reasonable interpretation, the claims read on mental steps. In *Comiskey* (*In re Comiskey*, 84 USPQ2d 1670) the court established that "the application of human intelligence to the solution of practical problems is not and of itself patentable" (at 1680). In *Comiskey*, the court stated explicitly "mental processes - or processes of human thinking - standing alone are not patentable even if they have a practical application" (at 1679). The court in *Comiskey* stated, "Following the lead of the Supreme Court, this court and our predecessor court have refused to find processes patentable when they merely claimed a mental process standing alone and untied to another category of statutory subject matter even when a practical application was claimed" (at 1680). In the instant claims, the process is not tied to a class of statutory invention.

Claims 1-10, 20, and 28-29 recite providing an output or a response to a user. The output is an insignificant post-solution activity. The court in *Comiskey*, stated "the

court rejected the notion that mere recitation of a practical application of an abstract idea makes it patentable, concluding that "[a] competent draftsman could attach some form of post-solution activity to almost any mathematical formula" citing *Flook* (437 U.S. at 586, 590). Applicant is encouraged to consider the recent BPAI informative decisions *Exparte Langemyr* (No. 2008-1495 (28 May 2008)) and *Exparte Biliski* (No. 2002-2257 (26 September 2006)) for further clarification of the above grounds of rejection.

***Claim Rejections - 35 USC § 112, Second Paragraph***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation of physically transforming the identified motifs. The metes and bounds of the term "physically transforming the identified motifs" is indefinite. The method as a whole is directed to a computational method for identifying a motif; presumably, the method will result in an identified motif. The identified motif is a unit of information generated by the process of claim. It is unclear what is intended by applicant in reciting "physically transforming" the identified motif. The specification is silent with regard to what applicant intends to encompass in the phrase.

***Claim Rejections - 35 USC § 112, First Paragraph***

***Response to Arguments***

Applicant's arguments, see Remarks p.1-2, filed 06 August 2008, with respect to the rejection of claims 1-10, 20, 28, and 29 as lacking enablement under 35 USC 112, first paragraph have been fully considered and are persuasive. The rejection of claims 1-10, 20, 28, and 29 has been withdrawn in view of applicants argument that the term "simultaneously" "is not intended to refer to the identification of motifs or positions in different sequences that changed or mutate at a particular, specific time in the past (e.g. 10,000 B.C.). Thus, in the context of the application, the terms "simultaneously" or "the same time" do not refer to the timing, of mutations in terms of chronological, geological or evolutionary time, but instead refer to whether such mutations are seen in the context of a particular matrix to occur together.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

***NEW MATTER***

Claim 1-10, 20, and 28-29 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application



was filed, had possession of the claimed invention. THIS IS A NEW MATTER REJECTION.

Claim 1 recites the step of outputting identified motifs to a display, a memory another computer, a network, a user, or physically transforming the identified motives. The disclosure as originally filed is completely silent regarding any of the manners of output as recited in the outputting step of claim 1.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 1, 2, 4, 5, 9-10 and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rose et al. (Bioinformatics, Vol. 16, No. 4, p. 400-401, 2000) and in view of Zhang et al (New England Journal of Medicine, Vol. 340, No. 21, p. 1605-1613, 27 May 1999).

Claim 1 is directed to a process for identifying motif in a set of sequences comprising aligning a set of sequences; comparing a reference sequence to the set of sequences; identifying a motif that mutated and outputting the identified motif. In an embodiment, a motif is a nucleotide and the sequences of the set are selected from a databank. In an embodiment the sequence is a wild type sequence. In an embodiment, the reference sequence is aligned to the set of sequences. In an embodiment, the sequences are obtained from an organism having a high level of mutability.

Rose et al. shows a process of identifying sites of hyper mutability in HIV sequences. Rose et al. shows that a set of sequences is aligned and a reference sequence is compared to the set of sequences to identify the positions or motifs in the reference that have mutated (p. 401, col. 1). Rose et al. shows that mutated positions are identified and output (p. 401 col. 1). In an embodiment, Rose et al. show that the sequences comprise nucleotides (figure 1). In an embodiment, Rose et al. shows that the position of a motif in the reference sequence is the same position in the set of sequences (p. 401, col. 1). Rose et al. shows in figure 1 the comparison of 2 sequences

from the same patient demonstrating hypermutability as compared to a reference sequence from the same patient, wherein the reference is interpreted to read on wild type. Rose et al. shows that an array or matrix is formed from the sequences to compare each nucleotide in the reference sequence. In an embodiment, Rose et al. shows the sequences are obtained from an organism having a high level of mutability (p. 400, col. 1). Rose et al. suggests that HIV sequences mutate during the course of antiviral therapy.

Rose et al. does not show that the identified mutations are correlated with known drug resistances or with catalytic site and/or in sites linked by noncompetitive inhibitors.

Zhang et al. shows that mutations occur in the course of treatment of patients with the drugs ritonavir, indinavir, saquinavir, zidovudine, and lamivudine that target the reverse transcriptase and protease of HIV (p.1609, col. 1). Zhang et al. shows that by monitoring the appearance of mutation in a rapidly adapting organism for mutations that confer resistance to drug, effective drug treatment regimens may be developed that facilitate the decrease in the size of the pool of latent virus (p. 1612, col. 1-2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Rose et al. for identifying mutations in HIV sequences relative to a wild type reference with the correlations of mutation to drug resistances that arise in response to treatment of Zhang et al. because Zhang et al. suggest that it is advantageous to monitor the appearance of mutations in response to therapy and to modify treatment as a way to decrease the size of the pool of latent virus.

Claims 3 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rose et al. in view of Zhang et al. as applied to claim 1-5, 9-10, and 28-29 above, and further in view of Collins et al. (Chapter 13: molecular sequence comparisons and alignment *In* Nucleic acid and protein sequence analysis, IRL Press, ed. Bishop and Rawlings, p. 232-358, 1987).

Claim 3 is directed to an embodiment in which the motif is an amino acid. Claim 6 is directed to the formation of binary matrices of NxM and MxM sizes and two sets of positions are determined. Claim 7 is directed to an embodiment in which a user selects positions. Claim 8 is directed to determining the positions that that mutate and the positions that do not mutate.

Rose et al. in view of Zhang et al. shows a process of identifying sequence positions that mutate. Zhang et al. shows that an array of positions is created to produce a multiple alignment (p. 1607, col. 1). Rose et al. shows that a user selection is made to specify the positions of interest (p. 401, col. 1). Rose et al. shows an embodiment in which positions that that mutate and the positions that do not mutate are determined.

Rose et al. in view of Zhang et al. does not explicitly show binary arrays.

Collins et al. show that binary arrays can be formed to compare sequences. Collins et al. call the array a dot plot (p.326). Collins shows that the dot plot is an array or matrix of  $j \times i$  cells in which pair wise comparisons can be made ranging from 0-j to 0-i

(p.326). Collins et al. shows the simplest type of dot plot consists of placing a dot in a cell in which the positions specifying the cell match (p. 326).

It would have been obvious to one of ordinary skill in the art to modify the method for identifying mutations of Rose et al. in view of Zhang et al. with the dot-plot of Collins et al. because Collins et al. shows that the dot plot comparison is a simple technique for producing pair wise comparisons. It would have been further obvious to one of ordinary skill in the art to modify the method for identifying mutations of Rose et al. in view of Zhang et al. with the dot-plot of Collins et al. because all the claimed elements were known, in the prior art, and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention. It would have been further obvious to one of ordinary skill in the art to modify the method for identifying mutations of Rose et al. in view of Zhang et al. and the dot-plot of Collins et al. to highlight non-matches because the dot-plot technique was recognized as part of the ordinary capabilities of one skilled in the art. One of ordinary skill in the art would have been capable of applying this known technique to indicate non matches in sequences using the dot plot sequence comparison method that was ready for improvement and the results would have been predictable to one of ordinary skill in the art.

### ***Double Patenting***

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or

discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1-10, 20, and 28-29 are provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-10, 21, and 29-30 of copending Application No. 11/480,014. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

### ***Conclusion***

None of the instant claims are in condition for allowance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARLHEINZ R. SKOWRONEK whose telephone number is (571) 272-9047. The examiner can normally be reached on 8:00am-5:00pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on (571) 272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. R. S./  
Examiner, Art Unit 1631

19 November 2008

/Marjorie Moran/  
Supervisory Patent Examiner, Art Unit 1631